

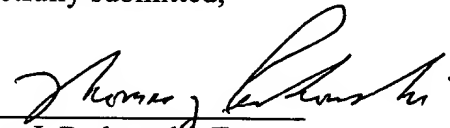
REMARKS

The proposed Amendments to the Specification have been provided to ensure correspondence between the Specification and the Formal Drawings filed herewith.

The Commissioner is hereby authorized to charge any fee deficiencies or credit any overpayments to Deposit Account 16-1340.

Respectfully submitted,

Dated: July 16, 2004




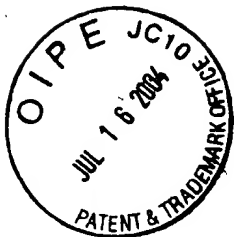
Thomas J. Perkowski, Esq.
Reg. No. 33,134
Attorney for Applicants
Thomas J. Perkowski, Esq., P.C.
Soundview Plaza
1266 East Main Street
Stamford, Connecticut 06902
203-357-1950
<http://www.tipatlaw.com>

CERTIFICATE OF EXPRESS MAILING
UNDER 37 C.F.R. 1.10

I hereby certify that this correspondence
is being deposited with the United States
Postal Service on July 16, 2004 in a Postage
Prepaid envelope as Express Mailing (No. EL975194049US)
addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450


Mailer: Annemarie Nadler
Date: July 16, 2004



30/335

RECEIVED

JUL 23 2004

OFFICE OF PETITIONS

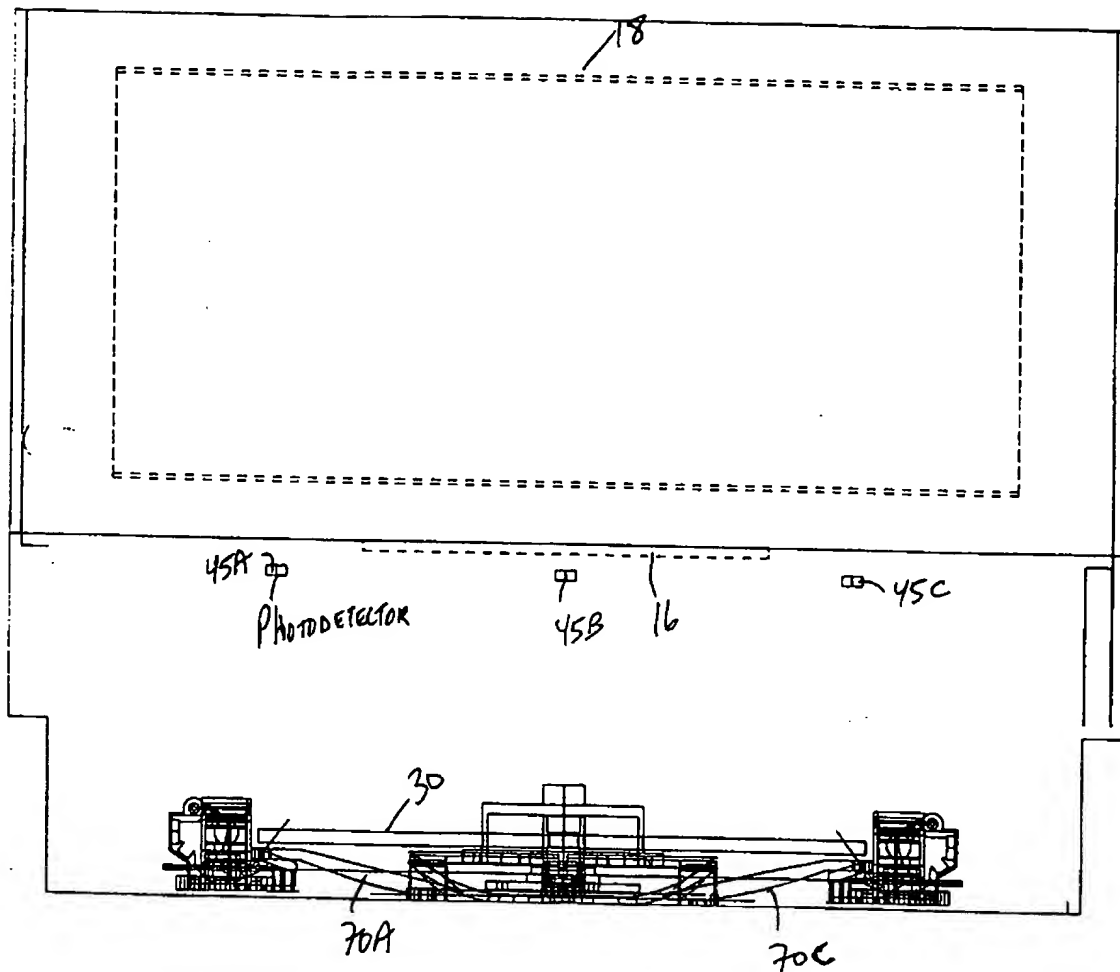
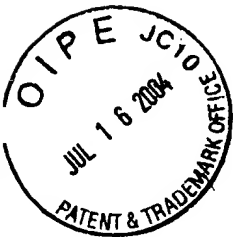


FIG. 2I1
2I



RECEIVED

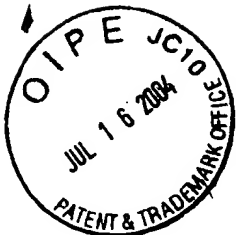
JUL 23 2004

OFFICE OF PETITIONS

48/335

Table of	Dependent Parameters for both the Scanner and the Disk	Disk	Problem items are highlighted (red)
Box height (inches):	N/A	(See Note 1)	
Box width (inches):	N/A	(See Note 2)	
Max angle B (degrees):	62.00	(See Note 3)	
Min angle B (degrees):	38.00	(See Note 3)	
Total facet angular sweep (degrees):	358.14	(See Note 4)	
Min (angle A - angle B) (degrees):	0.00	(See Note 6)	
Max beam speed (inches per second):	13704		
Min beam speed (inches per second):	7158		
Power at data detector (mW):	872		
Signal voltage (volts):	5.47	(See Note 7)	
Signal voltage at max DOF limits (volts):	3.45	(See Note 7)	
CDRH: P-avg. Class 2? Class 2A?	P-pulse Class 1? YES		0.91 Max bandwidth (MHz) for 7.5 mil bars
IEC: Single pulse PASS	Pulse train correction PASS	(See Note 8)	
Note 1: If this entry is highlighted (red) then the value exceeds the specified value for the box height (Cell G21). Go to cells G417 to G456 to identify the problem entries and make the necessary inner radius adjustments in Cells G215 to G254.			
Note 2: This entry is not used in the box design, but it gives an indication of the box dimensions that would be established by the width of the tops of the mirrors.			
Note 3: Generally, the B angles should range between 40 degrees and 70 degrees. Holograms with smaller or larger angles may be difficult to construct.			
Note 4: This entry must be less than, but within a few degrees of, 360 degrees. To satisfy this requirement, it may be necessary to make adjustments to the focal distances and/or the length of the scan lines.			
Note 6: This value must be greater than 0.5 degrees to avoid feedback into the laser from disk surface reflections. If it is too small, adjustments must be made to the B angles of the problem facets (See Cells X468 to X507).			
Note 7: The signal voltage must be greater than some value established by the signal processor requirements. Typically, this value should be greater than 2 volts. If this value is less than 2 volts, either the laser power must be increased or the focal distances must be decreased.			
Note 8: All CDRH/IEC entries must be YES or PASS. If not, laser power must be reduced. (Modify laser power in Cell B788.)			

FIGS. 3F1 and 3F2



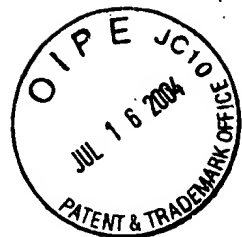
49/335

RECEIVED
JUL 23 2004
OFFICE OF PETITIONS

C air.

d = distance from disk to base of scanner (inches):														
Rotational speed of disk (rpm)														
Disk/Stratos 4.21e														
Facet	Diffraction	Focal length (inches)	Geometrical	Focal length (inches)	Angle A (degrees)	Angle B (degrees)	Angle of Diffraction (degrees)	Focal plane scan line length (inches)	Scan Angle (degrees)	Scan mult. Factor (m)	Rotation Angle (degrees)	Accounting for dead time for laser beam (degrees)	Light Collection Factor	Maximum Collection Area (ignoring notch)
1	12.5	12.73			52	38.00	52.00	9.750	42.61	1.62	26.24	27.39	1.00	2.28
2	11.5	11.68			52	40.00	50.00	9.760	45.95	1.62	28.35	29.50	0.80	1.81
3	12.7	12.94			52	42.00	48.00	9.750	42.00	1.58	28.66	27.81	0.92	2.09
4	11.5	11.68			52	44.00	46.00	9.760	45.95	1.57	29.19	30.34	0.71	1.62
5	12.7	12.94			52	48.00	42.00	9.750	42.00	1.50	27.97	29.12	0.79	1.79
6	12.0	12.21			52	52.00	38.00	9.750	44.22	1.46	30.28	31.43	0.84	1.47
7	14.7	15.08			52	58.00	32.00	9.750	35.69	1.31	27.99	29.14	0.87	1.97
8	14.7	15.08			52	58.00	32.00	9.750	35.69	1.31	27.99	29.14	0.87	1.97
9	13.5	13.80			52	60.00	30.00	9.750	39.71	1.30	30.65	31.80	0.71	1.61
10	13.5	13.80			52	60.00	30.00	9.750	39.71	1.30	30.65	31.80	0.71	1.61
11	14.8	15.19			52	62.00	28.00	9.750	36.46	1.25	29.19	30.34	0.83	1.88
12	14.8	15.19			52	62.00	28.00	9.750	36.46	1.25	29.19	30.34	0.83	1.88

FIG. 3G1 and
3G1B



50/335

D .atc.

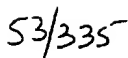
Notch size in mirror																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
----------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

FIG. 3G2
PGS. 3G2A and 3G2B



~~FIG. 3I~~
FIGS. 3I1 and 3I2

*** Modified Exposure Angles to Correct for Post-processing Residual Gelatin Swell ***													
DiskStratos 4.xls		Percent gelatin swell (from measurements) delta-U:		20%		650 nm							
Exposure angles at 468 nm		Exposure angles to compensate for swell		20%		650 nm							
Reference	Object	Reference	Object	Reference	Object	650 nm							
(degrees)	(degrees)	(degrees)	(degrees)	(degrees)	(degrees)	650 nm							
Beam	Beam	Beam	Beam	Beam	Beam	650 nm							
(degrees)	(degrees)	(degrees)	(degrees)	(degrees)	(degrees)	650 nm							
1	25.13	38.99	22.95	40.50	40.50	-4.08	-4.90	1.99	0.17	0.68	0.26	15.33	25.12
2	25.45	37.42	24.34	36.70	36.70	-3.54	-4.25	1.99	0.15	0.68	0.27	15.82	24.12
3	35.82	35.82	24.63	36.88	36.88	-2.99	-3.58	1.89	0.12	0.67	0.27	15.83	23.10
4	26.12	34.20	25.35	35.04	35.04	-2.41	-2.90	1.99	0.10	0.66	0.28	16.25	22.04
5	26.51	30.90	26.41	31.31	31.31	-1.22	-1.48	2.00	0.05	0.63	0.29	16.90	19.86
6	27.53	27.53	27.53	27.53	27.53	0.00	0.00	2.00	0.00	0.60	0.30	17.58	17.68
7	27.53	27.53	27.53	27.53	27.53	0.00	0.00	2.00	-0.08	0.58	0.30	17.58	17.68
8	28.28	28.28	28.28	28.28	28.28	1.92	2.31	2.00	-0.08	0.56	0.33	18.65	14.03
9	28.02	28.02	28.02	28.02	28.02	1.92	2.31	2.00	-0.11	0.55	0.33	18.65	14.03
10	28.02	28.02	28.02	28.02	28.02	2.58	3.10	1.99	-0.11	0.55	0.33	19.01	12.81
11	28.40	18.69	30.50	30.50	30.50	3.25	3.90	1.99	-0.14	0.53	0.33	19.37	11.58
12	28.40	18.69	30.50	30.50	30.50	3.25	3.90	1.99	-0.14	0.53	0.33	19.37	11.58



~~FIG. 3J~~ FIGS. 3J1 and 3J2

*** Analysis of the Focus Shift and Out-of-focus Spot Size for Converging Reference Beam ***						
(Not applicable for Stratus)						
Convergence of the reference beam:						
				-1477 mm		
				58.92 mm		
Distance from parabolic mirror to detector:						
				60 mm		
Facet	Design Focal length (mm)	Par. Mirror Eff. width (mm)	Required foc. length (mm)	Object distance (mm)	Image distance (mm)	Spot size at detector (mm)
1	317.50		401 404.42	-14858.75	59.05	0.54
2	282.10		401 364.09	31841.43	58.71	0.88
3	322.58		401 412.59	-11828.19	59.11	0.60
4	292.10		401 364.09	31841.43	58.71	0.88
5	322.58		401 412.59	-11828.19	59.11	0.60
6	304.80		401 384.03	-48230.76	59.89	0.75
7	373.38		401 495.67	4485.04	59.60	0.27
8	373.38		401 495.67	-4485.04	59.60	0.27
9	342.90		401 446.55	-6818.26	59.33	0.45
10	342.90		401 446.55	-6818.26	59.33	0.45
11	375.92		401 504.23	-4376.15	59.62	0.25
12	375.92		401 504.23	-4376.15	59.62	0.25

Distance (Cell E621) may have to be adjusted so that the maximum spot size at the detector is approximately the same when the 1/2 depth of field value is negative as it is when the 1/2 depth of field value is positive.
(The 1/2 depth of field value is located at Cell G19)



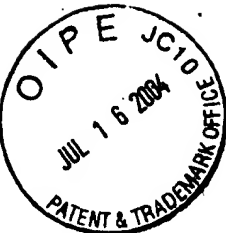
SS/335

* CDRW/IEC Calculations to Verify that the Scanner Meets the Laser Class Requirements **									
The number of overlapping lines (N-overlap) must be determined from the scanner data. A safe assumption for our scanners is to consider that two scan lines are overlapped ONLY when the difference between their diffraction angles (B) is less than 2 degrees. All else being equal, the slowest scan lines (largest angle B) will be the worst case scan lines.									
N-overlap:	1								
Motor speed (rpm):			5200						
Alpha-min (radians):			0.0015	(from standard)					
FWHM P-divergence of laser (deg.):			8	(Linked from Trmc spreadsheet)					
FWHM S-divergence of laser (deg.):			30	(Linked from Trmc spreadsheet)					
Focal length of collimating lens (mm):			6.1	(Linked from Trmc spreadsheet)					
Angle of incidence at MF plate (deg.):			29.23						
Angle of diffraction at MF plate (deg.):			42.12						
X-p (mm):			0.87						
X-s (mm):			3.93						
Average source dimension (mm):			2.40						
Distance to aperture (mm):			200	(actual distance or 200 mm, whichever is greater)					
Alpha (radians):			0.012						
C6:			7.996						
Laser power at window (mW)				tl (actual)					
		tc (200)	7 mm transit	time at d = 200 mm (seconds)					
Facet									Facet count
1	0.86	3.95856E-05	3.95856E-05	0.0000339					1
2	0.86	3.96549E-05	3.96549E-05	0.0000341					1
3	0.86	4.08001E-05	4.08001E-05	0.0000351					1
4	0.86	4.08315E-05	4.08315E-05	0.0000352					1
5	0.86	4.28115E-05	4.28115E-05	0.0000370					1
6	0.87	4.40086E-05	4.40086E-05	0.0000381					1
7	0.87	4.90358E-05	4.90358E-05	0.0000425					1
8	0.87	4.90358E-05	4.90358E-05	0.0000425					1
9	0.87	4.96126E-05	4.96126E-05	0.0000430					1
10	0.87	4.96126E-05	4.96126E-05	0.0000430					1
11	0.87	5.14525E-05	5.14525E-05	0.0000446					1
12	0.87	5.14525E-05	5.14525E-05	0.0000446					1

FIG. 3L1

FIGS. 3L1A and 3L1B

FIGS. 3L2A and 3L2B

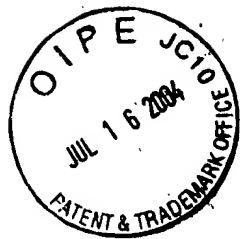


209/335

	N	O	P	Q	R	S	T	U	V	W	X
46	Facet	1									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.788	0.000	0.616		0.788	0.000	0.616		0.741	-0.367	0.582
52	-0.140	0.000	-0.990		-0.140	0.000	-0.990		-0.117	-0.367	-0.923
53	-0.595	0.448	0.667		-0.595	0.448	0.667		-0.590	0.098	0.801
54											
55											
56		Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
57	x	y	z		x	y	z		x	y	z
58	3.750	-1.600	2.509		3.000	0.000	-0.112				
59	5.100	-2.400	1.728		4.800	0.000	0.382				
60	5.100	2.400	1.728		5.071	-2.256	1.066				
61	3.750	1.600	2.509		5.071	-2.256	1.066				
62					3.060	-1.000	0.175				
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above										
70											
71					3.000	0.000	-0.112				
72					4.800	0.000	0.382				
73					5.071	2.256	1.066				
74					5.071	2.256	1.066				
75					3.060	1.000	0.175				
76											

FIG. 6D2

Station 2

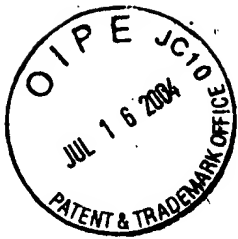


210/335

Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
46 Facet	2									
47 x	y	z								
48 -0.616	0.000	0.788								
49	End				Middle				End	
50 x	y	z		x	y	z		x	y	z
51 0.766	0.000	0.643		0.766	0.000	0.643		0.711	-0.395	0.581
52 -0.175	0.000	-0.985		-0.175	0.000	-0.985		-0.149	-0.395	-0.907
53 -0.623	0.440	0.647		-0.623	0.440	0.647		-0.614	0.062	0.787
54										
55										
56	Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
57 x	y	z		x	y	z		x	y	z
58 3.750	-1.600	2.509		3.000	0.000	-0.112				
59 5.100	-2.400	1.728		4.800	0.000	0.382				
60 5.100	2.400	1.728		5.071	-2.256	1.066				
61 3.750	1.600	2.509		5.071	-2.256	1.066				
62				3.060	-1.000	0.175				
63										
64										
65										
66										
67										
68										
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo									
70										
71				3.000	0.000	-0.112				
72				4.800	0.000	0.382				
73				5.071	2.256	1.066				
74				5.071	2.256	1.066				
75				3.060	1.000	0.175				
76										

FIG. 6D3

Station 2

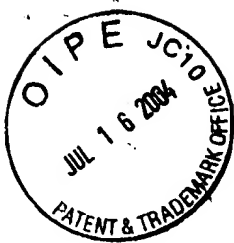


211/335

	A	B	C	D	E	F	G	H	I	J	K	L
46	Low Elevation	Facet	3									
47		x	y	z								
48	Vector from Module	-0.616	0.000	0.788								
49		End				Middle				End		
50		x	y	z		x	y	z		x	y	z
51	Output Vectors From Disk	0.743	0.000	0.669		0.743	0.000	0.669		0.697	-0.362	0.619
52	First Mirror Reflected Directions	-0.209	0.000	-0.978		-0.209	0.000	-0.978		-0.189	-0.362	-0.913
53	Second Mirror Reflected Directions	-0.649	0.433	0.625		-0.649	0.433	0.625		-0.648	0.089	0.757
54	Third Mirror Reflected Directions											
55												
56		Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners				
57		x	y	z		x	y	z		x	y	z
58	1	3.750	-1.600	2.509		3.000	0.000	-0.112				
59	2	5.100	-2.400	1.728		4.800	0.000	0.382				
60	3	5.100	2.400	1.728		5.071	-2.256	1.066				
61	4	3.750	1.600	2.509		5.071	-2.256	1.066				
62	5					3.060	-1.000	0.175				
63	6											
64	7											
65	8											
66												
67												
68												
69	Note: Special Case!	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above										
70												
71	Second Part of Mirror 2					3.000	0.000	-0.112				
72						4.800	0.000	0.382				
73						5.071	2.256	1.066				
74						5.071	2.256	1.066				
75						3.060	1.000	0.175				
76												
77												

FIG. 6D4

Station 2



212/335

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
46	Facet	4									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.719	0.000	0.695								
52	-0.243	0.000	-0.970								
53	-0.675	0.425	0.603								
54											
55											
56											
57	x	y	z								
58	3.750	-1.600	2.509								
59	5.100	-2.400	1.728								
60	5.100	2.400	1.728								
61	3.750	1.600	2.509								
62											
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo										
70											
71											
72											
73											
74											
75											
76											

FIG. 605

Station 2-



213/335

	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH
46	Facet	5									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.669	0.000	0.743		0.669	0.000	0.743		0.634	-0.311	0.708
52	-0.310	0.000	-0.951		-0.310	0.000	-0.951		-0.298	-0.311	-0.903
53	-0.724	0.407	0.557		-0.724	0.407	0.557		-0.730	0.114	0.673
54											
55											
56											
57											
58	3.750	-1.600	2.509		x	y	z		x	y	z
59	5.100	-2.400	1.728		3.000	0.000	-0.112				
60	5.100	2.400	1.728		4.800	0.000	0.382				
61	3.750	1.600	2.509		5.071	-2.256	1.066				
62					5.071	-2.256	1.066				
63					3.060	-1.000	0.175				
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo										
70											
71					3.000	0.000	-0.112				
72					4.800	0.000	0.382				
73					5.071	2.256	1.066				
74					5.071	2.256	1.066				
75					3.060	1.000	0.175				
76											

FIG. 6D6

Station 2

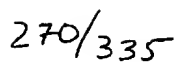


214/335

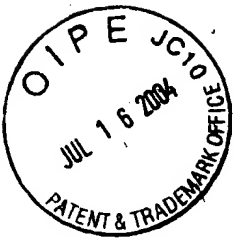
	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX
46	Facet	6													
47	x	y	z												
48	-0.616	0.000	0.788												
49	End			Middle			End								
50	x	y	z	x	y	z	x	y	z						
51	0.616	0.000	0.788	0.616	0.000	0.788	0.596	-0.232	0.769						
52	-0.376	0.000	-0.927	-0.376	0.000	-0.927	-0.369	-0.232	-0.900						
53	-0.770	0.387	0.508	-0.770	0.387	0.508	-0.781	0.173	0.600						
54															
55															
56	Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners								
57	x	y	z	x	y	z	x	y	z						
58	3.750	-1.600	2.509	3.000	0.000	-0.112									
59	5.100	-2.400	1.728	4.800	0.000	0.382									
60	5.100	2.400	1.728	5.071	-2.256	1.066									
61	3.750	1.600	2.509	5.071	-2.256	1.066									
62				3.060	-1.000	0.175									
63															
64															
65															
66															
67															
68															
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above mirrored about the y axis. I.e.:														
70															
71				3.000	0.000	-0.112									
72				4.800	0.000	0.382									
73				5.071	2.256	1.066									
74				5.071	2.256	1.066									
75				3.060	1.000	0.175									
76															

FIG. 607

-Station 2



~~F/G.~~ 9 Figs. qA through qC



288/335

Truncation analysis

Diagrams to radius conversion factor:

Truncation analysis: Effect of truncation on the diffraction limited spot size of a Gaussian beam

Given the laser and lens parameters, this spreadsheet will calculate the effect of truncation on the beam

The final result is an "effective diameter". This is an equivalent He-squared diameter that will

produce the same spot size at the focal point as the actual truncated beam. This is also the beam

diameter that will be inserted in the main scanner disk design spreadsheet.

The actual number linked to the main spreadsheet will be a rounded number.

It will usually be rounded up 0.1 to allow for tolerances.

500

SLD1137V8

Wavelength (nm)

8

these-P (degrees)

20

Alignment (microns)

7

Lens:

Local length (mm)

0.15

Numerical Aperture

0.5

Clear Aperture (mm)

7.2

Clearance at lens (mm)

4.6

He-squared beam diameter at lens (mm)

1.188

Aperture factor (m)

1.263

He-squared beam radius

0.782

(for normalised aperture)

Truncation factor:

1.319

To determine the effective diameter,

very 20 units $(A(Z)/A(0))^2 = 0.135335$ or,

equivalently, until $L(A(Z)/A(0))^2 = 2$

This can most easily be done by using

the SOLVER function of Excel Tools:

Target cell = \$C\$21; Value = 2

Change cell = \$C\$23

This is the effective beam diameter that

is linked to the Qrta spreadsheet

and the main disk design spreadsheet.

The remaining part of this spreadsheet is simply the numerical integration

of the diffraction equation for A(s) from the Mathcad program.

It includes the evaluation of the functions $(A(Z)/A(0))^2$ and $L(A(Z)/A(0))^2$.

It also includes a graph of $(A(Z)/A(0))^2$ vs Z.

delta-r

0.01

0.01 0.999445

0.02 0.999323

0.03 0.999256

0.04 0.999211

0.05 0.999181

0.06 0.999154

0.07 0.999127

0.08 0.999101

0.09 0.999075

0.1 0.999049

0.11 0.999023

0.12 0.998997

0.13 0.998971

0.14 0.998945

H = Heys; K = Kodak; P = Philips; Q = QrtaTech
(Alternate choices - from Tom's table)

K/A337	N/A41	K/77	P/A333	P/A335	P/A337	P/777	N/A43	N/A41	P/A333	N/A51	N/A52	K/A370	Q/A330
11	10	9.5	9	8	7.5	7	6.07	6.25	6.25	6	5.4	4.6	4.1
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
7.2	8	8.05	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5
4.6	4.7	4.1	3.9	3.5	3.3	3.7	3.1	3.2	3.4	3.3	2.9	2.1	1.7

m = 1 is He-squared truncation
m > 2 is essentially no truncation

He-squared radius at focal plane is
increased by this factor due to truncation.

To determine the effective diameter,

very 20 units $(A(Z)/A(0))^2 = 0.135335$ or,

equivalently, until $L(A(Z)/A(0))^2 = 2$

This can most easily be done by using

the SOLVER function of Excel Tools:

Target cell = \$C\$21; Value = 2

Change cell = \$C\$23

This is the effective beam diameter that

is linked to the Qrta spreadsheet

and the main disk design spreadsheet.

The remaining part of this spreadsheet is simply the numerical integration

of the diffraction equation for A(s) from the Mathcad program.

It includes the evaluation of the functions $(A(Z)/A(0))^2$ and $L(A(Z)/A(0))^2$.

It also includes a graph of $(A(Z)/A(0))^2$ vs Z.

Zn =

0.1

A(Z1)

A(Z2)

A(Z3)

etc.

0

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

1E-04

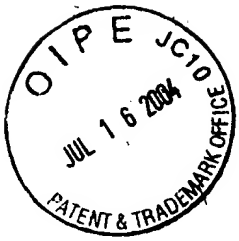
1E-04

1E-04

1E-04

FIG. 11A1

FIGS. 11A1A Through 11A1H



290/335

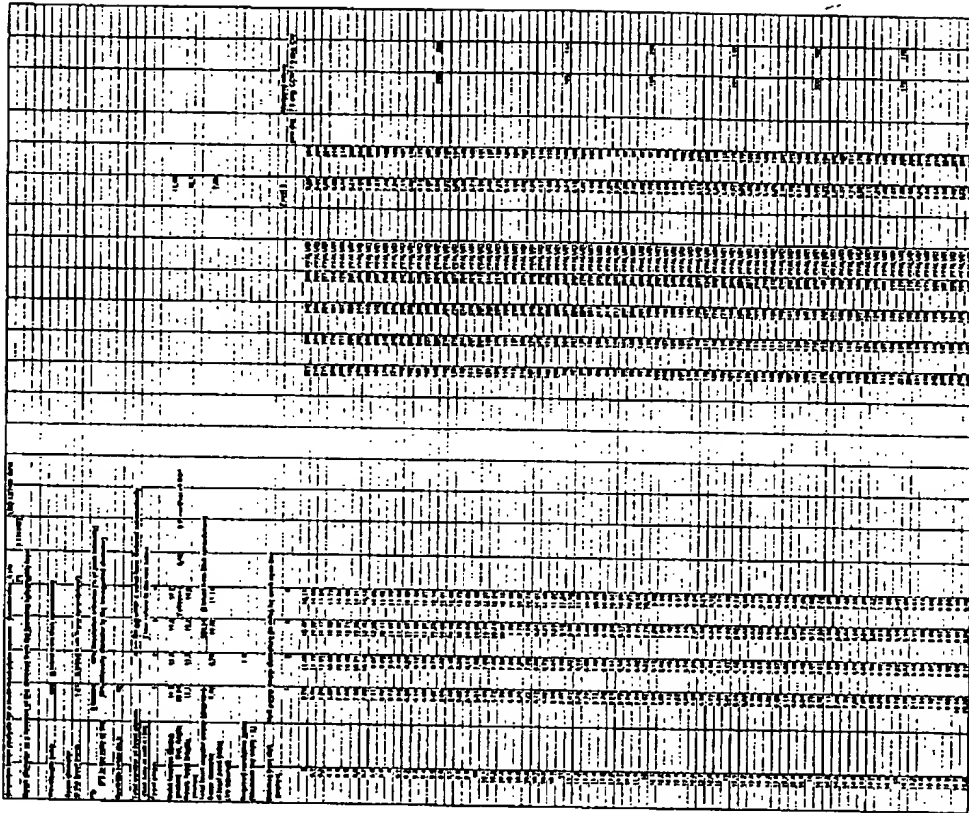


FIG 11B1
FIGS. 11B1A through 11B1H



291/335

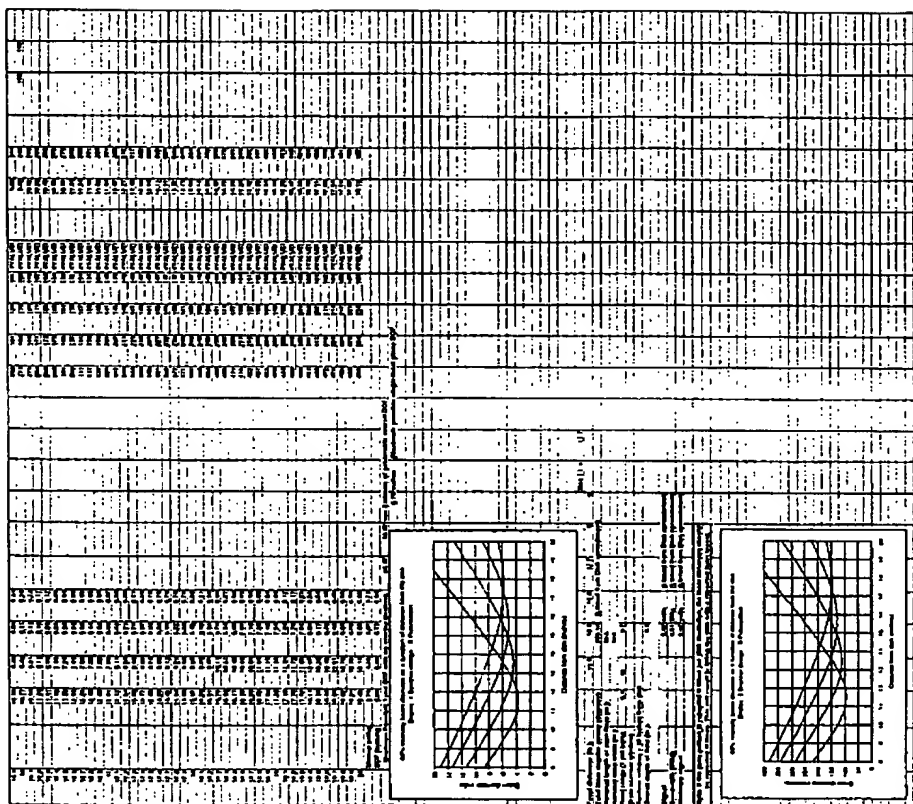


FIG. 11B2

FIGS. 11B2A through
11B2E



298/335

	A	B	C	D	E	F	G	H	I	J	K	L	M
106		Facet 1											
107	G3												
108		5.11617	1.95380	1.89155	5.01400	1.88093	1.96715	4.92433	1.81870	2.03365	4.82789	1.75935	2.10576
109	Point 1	4.98460	1.86904	1.98969	4.88136	1.79109	2.06571	4.77964	1.72960	2.14196	4.68407	1.66502	2.21298
110	Point 2	4.94695	2.08109	2.03847	4.88064	1.79549	2.06667	4.75362	1.86942	2.17507	4.68407	1.66502	2.21298
111	Point 3	4.55990	1.69707	2.31542	4.49555	1.51422	2.37191	4.31720	1.51260	2.49402	4.34215	1.44090	2.46771
112	Point 4	4.35785	1.69559	2.16575	4.28296	1.52325	2.24765	4.14486	-1.55897	2.36336	4.17995	-1.53887	2.33666
113	Point 5	4.71038	-2.01784	1.86940	4.68022	-1.80322	1.91239	4.54753	-1.91413	2.00915	4.50146	-1.76326	2.05933
114	Point 6	4.77395	-1.80620	1.83693	4.68147	-1.79863	1.91177	4.59009	-1.77513	1.98718	4.50146	-1.76326	2.05933
115	Point 7	4.89971	-1.80063	1.72662	4.80732	-1.86882	1.80291	4.72764	-1.86391	1.86903	4.83750	-1.85821	1.94186
116	Point 8	5.11617	1.95380	1.89155	5.01400	1.88093	1.96715	4.92433	1.81870	2.03365	4.82789	1.75935	2.10576
117	Start of scan line	5.11614	1.00830	1.80878	5.02116	0.94389	1.87935	4.92928	0.88565	1.94798	4.84129	0.83137	2.01383
118	Middle of rotation	5.03523	0.00000	1.78542	4.95474	0.00000	1.85000	4.87537	0.00000	1.91369	4.79689	0.00000	1.97666
119	End of scan line	5.00607	-0.98140	1.72464	4.92129	-0.94701	1.79393	4.83778	-0.91710	1.86358	4.75656	-0.89961	1.93026
120													

FIG. 13A3 Figs. 13A3A and 13A3B

MRI

Station 1



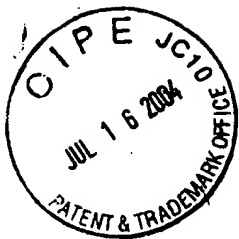
304/335

	A	B	C	D	E	F	G	H	I	J	K	L	M
106		Facet 1			Facet 2			Facet 3			Facet 4		
107	G3	4.36645	2.65378	0.19632	4.13039	2.57939	0.16456	3.89207	2.57127	0.13136	3.63985	2.49916	0.09731
108	Point 1	4.22328	2.62785	0.17673	3.98981	2.54937	0.14541	3.72893	2.54596	0.10897	3.48464	2.46924	0.07610
109	Point 2	4.17478	2.60928	0.18686	3.98888	2.55291	0.14522	3.69351	2.66181	0.10205	3.48464	2.46924	0.07610
110	Point 3	3.78748	2.62732	0.11577	3.59353	2.46410	0.09002	3.24144	2.51989	0.04122	3.13971	2.40274	0.02698
111	Point 4	3.59708	1.89946	0.16625	3.42901	1.80124	0.14108	3.10957	1.84718	0.09716	3.03925	1.79742	0.08649
112	Point 5	4.00140	-2.16622	0.22737	3.66105	-1.97527	0.20448	3.58373	-2.08109	0.16749	3.40752	-1.93323	0.14032
113	Point 6	4.08710	-1.99138	0.23359	3.66230	-1.97181	0.20460	3.62849	-1.96992	0.17186	3.40752	-1.93323	0.14032
114	Point 7	4.22016	-2.04815	0.25597	4.01328	-2.03180	0.22675	3.80192	-2.02808	0.19711	3.57490	-1.99474	0.16470
115	Point 8	4.36645	2.65376	0.19632	4.13039	2.57939	0.16456	3.89207	2.57127	0.13136	3.63985	2.49916	0.09731
116	Point 9	4.03611	1.87032	0.21487	4.17745	1.84317	0.18369	3.94222	1.82246	0.15114	3.70025	1.80404	0.11760
117	Start of scan line	4.29670	0.23013	0.22786	4.10000	0.25000	0.20000	3.89313	0.27090	0.17070	3.67474	0.29297	0.13978
118	Middle of rotation	4.30820	-1.28070	0.25535	4.10701	-1.28769	0.22718	3.89234	-1.28997	0.19885	3.66989	-1.27078	0.16575
119	End of scan line												
120													

Fig. 13B3 and
13B3B

MR2

Station 1



313/335

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
105																			
106																			
107																			
108																			
109																			
110																			
111																			
112																			
113																			
114																			
115																			
116																			
117																			
118																			
119																			
120																			

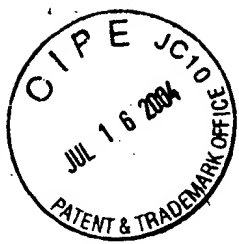
FIG. 14A1 FIGS. 14A1A and 14A1B

$$314/335$$
[illegible]

~~Fig. 14B1~~ Figs. 14B1A and 14B1B

~~Fig. 14C1A~~ and
14C1B

316/335



319/335

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
106		Facet 1			Facet 2			Facet 3			Facet 4			Facet 5			Facet 6		
107	03	Point 1	0.36621	3.60327	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
108		Point 2	0.36657	3.72260	2.27018	0.29548	3.92259	2.20114	0.30320	4.15942	7.13030	0.29182	4.38726	6.97894	0.30016	4.89859	6.81701	0.28708	5.40695
109		Point 3	0.43214	3.78948	2.27048	0.29830	3.93374	2.09660	0.33865	4.19794	7.13030	0.29182	4.38726	6.97894	0.30016	4.89859	6.81701	0.28708	5.40695
110		Point 4	0.19003	4.09898	2.13404	0.12237	4.26827	7.04322	0.18475	4.37132	7.02045	0.15884	4.66313	6.81788	0.12498	5.31804	6.72143	0.18544	5.65479
111		Point 5	-2.71194	3.85330	0.89268	-2.94072	3.63654	6.61109	-2.77069	4.17839	6.51331	-3.93734	4.23771	6.38745	-2.80040	4.82441	6.22148	-3.08048	5.23666
112		Point 6	-2.91744	3.36218	6.78569	-2.85787	3.51184	6.69286	-2.89597	3.60174	6.61895	-3.02659	3.86462	6.47756	-2.82071	4.49112	6.28421	-3.12902	4.98856
113		Point 7	-2.74539	3.33225	6.77043	-2.85433	3.51128	6.71818	-2.78911	3.78590	6.61895	-3.02659	3.86462	6.47756	-2.82071	4.49112	6.28421	-3.12902	4.98856
114		Point 8	-2.80459	3.21407	6.78462	-2.89436	3.40022	6.74983	-2.83403	3.84875	6.64413	-3.08116	3.84879	6.51482	-2.85743	4.54377	6.32024	-3.16038	4.94819
115		Point 9	0.00000	3.69271	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
116		Point 10	0.00000	3.69271	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
117		Start of scan line	0.00000	3.69271	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
118		Middle of scan line	0.00000	3.69271	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
119		End of scan line	0.00000	3.69271	2.31835	0.35437	3.81836	2.2312	0.35203	4.03445	7.17887	0.35054	4.26573	7.03506	0.35881	4.74102	6.87159	0.34312	5.26344
120																			

FIG. 15A3 FIGS. 15A3A and 15A3B



322/335

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
106	Facet 1			Facet 2			Facet 3			Facet 4			Facet 5			Facet 6		
107	Point 1	7.39483	0.36621	3.63327	0.35437	3.81806	7.23212	0.36290	4.03443	7.17807	0.35054	4.26073	7.00006	0.33981	4.74102	0.33981	0.34512	5.26344
108	Point 2	7.39483	0.36621	3.72200	0.29248	3.92583	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
109	Point 3	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
110	Point 4	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
111	Point 5	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
112	Point 6	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
113	Point 7	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
114	Point 8	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
115	Point 9	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
116	Point 10	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
117	Start of mean line	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
118	End of mean line	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
119	Mean line	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895
120	End of mean line	7.39483	0.43214	3.72200	0.29248	3.93374	7.20014	0.30320	4.18642	7.13000	0.29182	4.36728	6.97694	0.30016	4.88858	0.29708	0.29708	5.40895

FIG. 15B3 Figs. 15B3A and 15B3B



325/335

FIG. 15C3
FIGS. 15C3A and 15C3B

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
106		Face 1			Face 2			Face 3			Face 4			Face 5			Face 6		
107	Point 1	7.38403	0.36821	3.60227	7.31633	0.35437	3.81826	7.25212	0.36203	4.03445	7.17687	0.33034	4.28573	7.00306	0.35681	4.74102	6.97159	0.34312	5.26544
108	Point 2	7.33669	0.30877	3.72286	7.27018	0.29548	3.93296	7.20014	0.30320	4.15842	7.13000	0.29192	4.39726	6.97894	0.30016	4.68659	6.81701	0.29706	5.40885
109	Point 3	7.35063	0.45214	3.76948	7.27046	0.29530	3.93374	7.20040	0.30835	4.19794	7.13000	0.29192	4.39726	6.97894	0.30334	4.68784	6.81701	0.29706	5.40885
110	Point 4	7.19969	0.19089	4.09655	7.13404	0.12207	4.28827	7.04032	0.14425	4.37132	7.02005	0.13594	4.68313	6.81238	0.12486	5.31804	6.72143	0.18544	5.65479
111	Point 5	6.78186	-2.71194	3.65330	6.68268	-2.64072	3.53854	6.51838	-2.72039	4.17839	6.55131	-2.83734	4.23771	6.26745	-2.80040	4.59241	6.22148	-3.10546	5.23668
112	Point 6	6.82335	-2.81744	3.98219	6.76985	-2.69217	3.81186	6.63016	-2.83997	3.90174	6.61689	-3.02939	3.96582	6.47984	-2.92071	4.49196	6.26421	-3.12602	4.98856
113	Point 7	6.88186	-2.78325	3.32225	6.77043	-2.69435	3.81186	6.63016	-2.83997	3.90174	6.61689	-3.02939	3.96582	6.47984	-2.92071	4.49196	6.26421	-3.12602	4.98856
114	Point 8	6.88054	-2.80469	3.21407	6.76886	-2.69435	3.81186	6.63016	-2.83997	3.90174	6.61689	-3.02939	3.96582	6.47984	-2.92071	4.49196	6.26421	-3.12602	4.98856
115	Point 9	7.30403	0.30821	3.60227	7.31633	0.35437	3.81826	7.25212	0.36203	4.03445	7.17687	0.33034	4.28573	7.00306	0.35681	4.74102	6.97159	0.34312	5.26544
116	Start of scan line	7.32325	0.00000	3.57245	7.25890	0.00000	3.81826	7.18248	0.00000	4.00000	7.12388	-0.00002	4.22381	6.97902	0.00000	4.69890	6.82144	0.00000	5.21120
117	Middle of scan line	7.32325	0.00000	3.57245	7.25890	0.00000	3.81826	7.18248	0.00000	4.00000	7.12388	-0.00002	4.22381	6.97902	0.00000	4.69890	6.82144	0.00000	5.21120
118	End of scan line	7.01771	-2.11472	2.23472	6.84339	-2.31840	3.41071	6.07655	-2.14504	3.68867	6.77390	-2.39484	3.83304	6.84346	-2.28783	4.33980	6.44831	-2.50433	4.84742

328/335

~~FIG. 15D3~~ FIGS. 15D3A and 15D3B

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
106																		
107	63																	
108																		
Point 1	7.39443	0.3621	3.6027	7.3185	0.3437	3.6198	7.2812	0.3623	4.0245	7.1787	0.3304	4.2673	7.0508	0.3391	4.7102	8.8719	0.3412	5.2634
Point 2	7.35669	0.3067	3.7280	7.27018	0.29548	3.8389	7.22014	0.30320	4.16642	7.13000	0.29182	4.3976	6.9784	0.30018	4.8663	8.81701	0.28708	5.40885
Point 3	7.30683	0.43214	3.7894	0.29830	0.39374	0.35374	0.70660	0.36665	4.19784	0.71904	0.29182	4.3976	6.9781	0.30334	4.81704	8.81701	0.29708	5.40885
Point 4	7.19688	0.19089	4.05895	7.13045	0.19297	4.26827	7.04932	0.19476	4.67132	7.02005	0.19384	4.89313	6.81286	0.19248	5.31704	8.71243	0.18544	5.84778
Point 5	6.87106	-2.71194	3.93330	6.88288	-2.84072	3.72069	6.81109	-2.72089	4.23771	6.84131	-2.73754	4.23771	6.28745	-2.70040	4.82441	6.22148	-3.08048	5.27668
Point 6	6.23335	-2.87184	3.34519	6.26788	-2.85797	3.61184	6.68268	-2.86857	3.90174	6.68268	-3.02659	4.23771	6.28745	-2.82071	4.49166	4.22148	-3.12602	4.86658
Point 7	6.68158	-2.76329	3.33925	6.77043	-2.84482	3.41128	6.71818	-2.78811	3.78090	6.81689	-3.06818	3.96892	6.47749	-2.97119	4.48127	6.28421	-3.12602	4.86658
Point 8	6.80504	-2.80489	3.21407	6.78602	-2.89436	3.40022	6.75002	-2.83000	4.03445	6.84612	-3.06818	3.96892	6.47749	-2.97119	4.48127	6.28421	-3.12602	4.86658
Point 9	7.39443	0.3621	3.6037	7.3185	0.35437	3.6198	7.2812	0.3623	4.03445	7.1787	0.3304	4.2673	7.0508	0.3391	4.7102	8.8719	0.3412	5.2634
Point 10	7.32381	0.00361	3.7594	7.25800	0.00056	3.78942	7.18246	0.00004	4.03445	7.12389	-0.00002	4.22381	6.97602	0.00007	4.75960	8.82144	0.00008	5.21121
Start of basin line	7.32381	0.00361	3.7594	7.25800	0.00056	3.78942	7.18246	0.00004	4.03445	7.12389	-0.00002	4.22381	6.97602	0.00007	4.75960	8.82144	0.00008	5.21121
Middle of rotation	7.32325	0.00000	3.75781	7.25833	0.00000	3.78533	7.18245	0.00000	4.00000	7.12389	0.00000	4.22382	6.97601	0.00000	4.69478	8.82143	0.00000	5.21120
End of basin line	7.32372	-2.11473	3.34792	6.62439	-2.31840	3.41071	6.71815	-2.14504	3.68987	6.77390	-3.04645	4.23843	6.63430	-2.76765	4.33960	6.54831	-2.50435	4.84745